

16.0 Shiprock, New Mexico, Disposal Site

16.1 Compliance Summary

The Shiprock, New Mexico, Disposal Site, inspected on August 15, 2007, is in excellent condition. Erosion along the southwest bank of the outflow channel requires repair. All other structures are in good condition. Research associated with cell performance that includes the collection of saturated hydraulic conductivity measurements, continued. DOE continues to study the effects of deep-rooted vegetation encroachment on the cell to evaluate the need for ongoing control. Scattered shrubs on the cell and in the outflow channel require additional treatment. Tumbleweeds and trash continue to accumulate along the perimeter fence and in the outflow channel area; removal is warranted in the outflow channel. No cause for a follow-up or contingency inspection was identified.

16.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Shiprock, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site are specified in the *Long-Term Surveillance Plan [LTSP] for the Shiprock Disposal Site, Shiprock, New Mexico* (DOE/AL/62350–60F, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, September 1994) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 16–1.

Table 16–1. License Requirements for the Shiprock, New Mexico, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 16.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 16.3.2
Routine Maintenance and Repairs	Section 8.0	Section 16.3.3
Groundwater Monitoring	Section 5.0	Section 16.3.4
Corrective Action	Section 9.0	Section 16.3.5

Institutional Controls—DOE Order 454.1 defines institutional controls as federal control of the property, site perimeter fencing, warning/no trespassing signs along the property boundary, and a locked gate at the entrance to the site.

The 105-acre disposal site is held-in-trust by the United States of America for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. The site was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1996. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. DOE retains perpetual access to the site through a Custody and Access Agreement with the Navajo Nation (DE-FC04-83AL16258, October 7, 1983).

Inspectors found no evidence that these institutional controls were ineffective or violated.

16.3 Compliance review

16.3.1 Annual Inspection and Report

The results of Shiprock, New Mexico, Disposal Site inspection, conducted on August 15, 2007, are discussed below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 16–1. Numbers in the left margin refer to items in the Executive Summary table.

16.3.1.1 Specific Site Surveillance Features

Access Road, Gates, Fence, and Signs—Access to the site is via a gravel road off U.S. Highway 491 and through a sand and gravel processing facility operated by the Navajo Engineering and Construction Authority (NECA) to the main entrance gate.

All three vehicle access gates—the main entrance gate at the east corner of the site (near the terrace escarpment), the gate providing terrace access at the northwest corner of the site, and the old entrance gate at the west corner of the site—were locked and in good condition. The four entrance signs were in good condition.

The security fence along the perimeter was in good condition except for the area where past bulldozing activity within the NECA yard resulted in dirt being pushed up against the fence fabric. There are several bent poles and a section of bent fence fabric between perimeter signs P11 and P12. Although damaged, the fence continues to prohibit access into the DOE controlled area. Inspectors will continue to monitor this area to ensure that the fence remains intact and functional.

Small quantities of tumbleweeds and windblown trash have accumulated along the outside and inside of the southwest perimeter fence and in places outside the fence bordering the NECA yard. Windblown sand continues to accumulate along the southwest side of the disposal site and, to a lesser extent, in other areas (PL–1). This sediment allows for growth of annual weeds and shrubs. Tumbleweeds and trash have also accumulated on the outside perimeter fence in the outflow channel (PL–2). This debris could potentially impede water flow in the channel and will be removed in 2008. DOE will continue to monitor and remove significant tumbleweed, trash, and windblown sand accumulations on site.

Small animals continue to penetrate the fence around the perimeter. The rock fill placed in these areas in 2006 remains effective and no additional gaps were noted.

Four entrance signs and seventeen pairs of numbered perimeter signs (one standard warning sign with text and one Navajo danger pictorial sign) are attached to the security fence. All signs were present and in good condition.

Site Markers and Monuments—Two site markers are placed at the site; site marker SMK–1 is just inside the former main entrance gate and site marker SMK–2 is on top of the disposal cell. Both markers were in good condition at the time of the 2007 inspection.

All three survey monuments were inspected and in good condition.

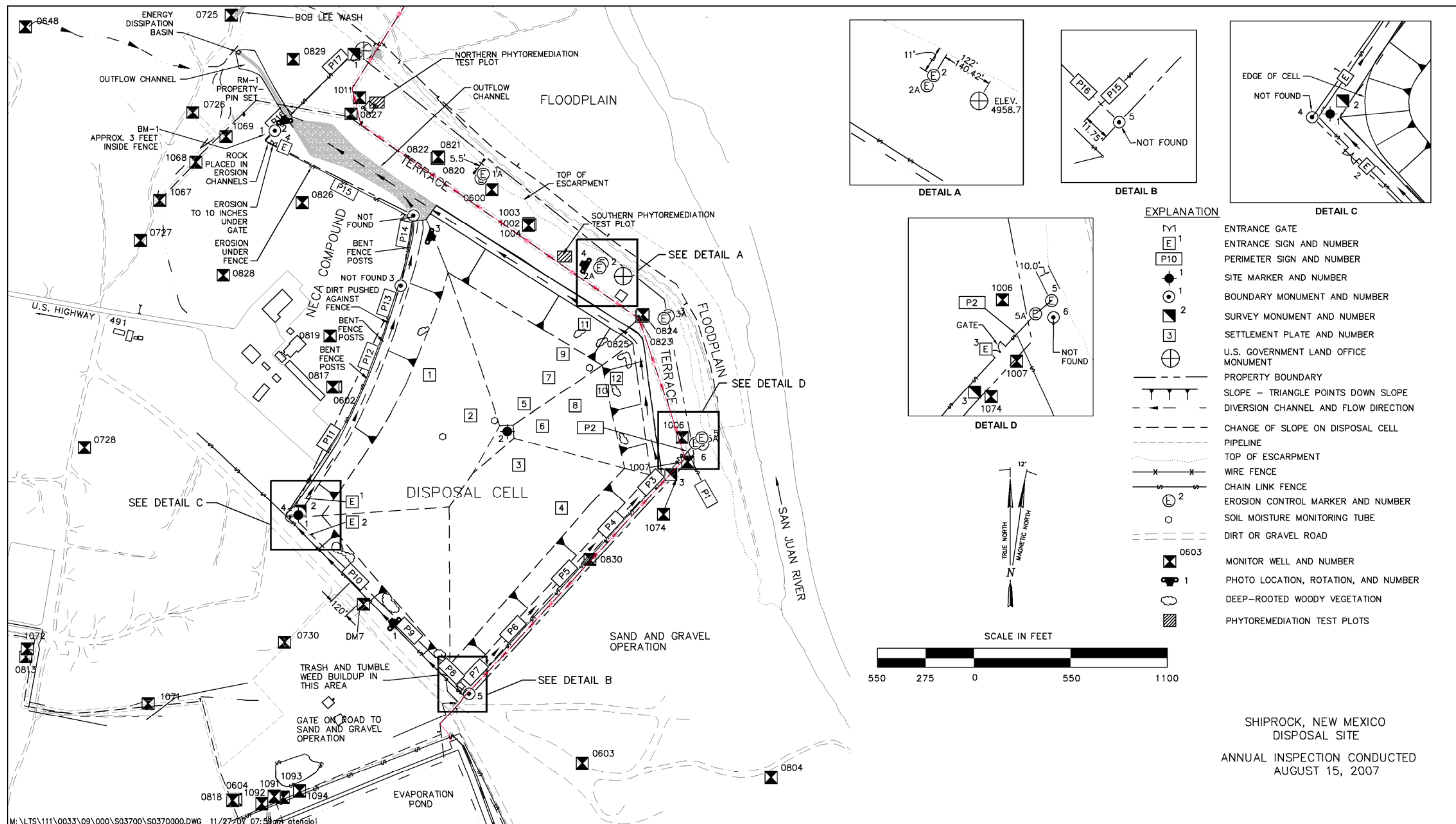


Figure 16-1. 2007 Annual Compliance Drawing for the Shiprock, New Mexico, Disposal Site

In 2007, only boundary monument BM-1 was located. The five remaining boundary monuments were buried by windblown sand or inadvertently removed by past construction activities. DOE will subcontract a licensed surveyor to find and/or reestablish the monuments.

Erosion Control Markers—The four sets of erosion control markers along the edge of the terrace escarpment were in good condition and were not threatened by erosion.

Monitor Wells—Groundwater monitoring for cell performance is not required by the LTSP for this site. Ground Water Compliance Action Plan (GCAP) monitor wells, in and around the site, are not included in the annual inspection because the groundwater restoration staff maintain the wells during the frequent sampling events.

16.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal cell (including the riprap-covered top and side slopes, diversion channels, and outflow channel); (2) the terrace area north and northeast of the disposal cell; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Disposal Cell, Diversion Channels, and Outflow Channel—The riprap-covered top and side slopes of the cell are in good condition. No evidence of settling or slumping was found.

16A Deep-rooted woody vegetation has been noted during past inspections on the top and side slopes of the cell. Treatment has been effective; only a few scattered plants were observed in 2007. DOE is continuing to study the effects of plant encroachment on the disposal cell to evaluate the need for ongoing vegetation control. Saturated hydraulic conductivity measurements continue to be collected at five locations on the cell to evaluate cover performance. Shallow pits exposing the freeze protection layer were left uncovered for additional measurements and do not affect the performance of the cell cover.

Diversion channels around the base of the disposal cell were in good condition. In 2006, tire tracks left minor ruts in the riprap along the northwest diversion channel. The ruts, still visible, will be filled to ensure the riprap thickness meets design specifications.

Site drainage is ultimately directed toward the outflow channel at the northwest corner of the site. The outflow channel was reconstructed in 2003 to repair damage caused by severe storms in 2001 and 2002, and an energy dissipation basin was constructed immediately above Bob Lee Wash. In 2007, one new area of erosion, approximately 20 feet in length, was observed along the southwest bank of the outflow channel. The rock riprap was undercut in this area. Because this area could potentially worsen with additional rainfall events, it will be repaired. The lower, steeper portion of the outflow channel and the energy dissipation structure are in excellent condition. Rock cover in the outflow channel is in good condition.

Woody vegetation in the outflow channel has been treated with herbicide in past years. The 2006 herbicide treatment was highly effective, with an estimated 95 percent kill (PL-3). Several patches of deep-rooted vegetation remain and are noted on Figure 16-1. Most of the vegetation on the cell is composed of shallow-rooted vegetation. Several noxious weeds were found and pulled by hand during the inspection.

Vegetation growing in the diversion and outflow channels protects the edges of the channel from erosion without impeding the flow of water and it will not be removed. Tumbleweed accumulation was observed in the outflow channel. In a flood event, these tumbleweeds may collect downstream and impede the flow of water and, therefore, they will be removed in 2008.

Terrace Area and Site Perimeter—The terrace area is north and east of the disposal cell between the cell and the escarpment. The escarpment, more than 300 feet from the eastern edge of the disposal cell, is prone to slumping. Four sets of erosion control markers are placed along the terrace escarpment. Fractures and incipient slumps commonly occur in the Mancos Shale bedrock along the escarpment northwest of erosion control marker 1A. The erosional “pillar” that had separated from the edge of the escarpment and was documented previously, showed no new movement in 2007. Inspectors will continue to monitor the stability of the escarpment.

16B Two test plots that demonstrate plants useful for phytoremediation continue to collect data on the northeast side of the terrace (PL-4). The purpose of the testing is to demonstrate the effectiveness of using phreatophytes for removing former processing-site legacy ground water contamination from the terrace. The experiments will last from 3 to 5 years.

Scattered occurrences of noxious weeds were found in 2007. At the time of the inspection, it was too late in the season to treat effectively, so herbicide treatment will be conducted in August 2008.

Outlying Area—A sand and gravel pit operated by NECA is immediately southeast of the disposal cell. Gravel operations were underway in 2007, and heavy equipment was operating in the pit during the inspection. All activities were located well away from the disposal site perimeter, and have no affect on the integrity of the site. Inspectors will continue to monitor sand and gravel operations to ensure that gravel pit activities do not encroach upon, or interfere with, the disposal site perimeter.

In 2002 DOE constructed an 11-acre lined evaporation pond (across the public access road) as part of the ongoing groundwater treatment program. A chain-link security fence encloses the area. Although the activities associated with the treatment of contaminated ground water at this site are not within the scope of the LTSP, the pond will be monitored for general condition and security during future inspections. At the time of the 2007 site inspection, there were no concerns or issues noted within this area.

16.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2007.

16.3.3 Routine Maintenance and Repairs

No maintenance or repairs occurred at the site in 2007.

16.3.4 Groundwater Monitoring

The LTSP does not require groundwater monitoring at the site due to the hydrogeologic conditions that are present: an upward hydraulic gradient within the uppermost aquifer and an effective confining layer on which the cell was constructed (i.e., the low permeability of the unweathered Mancos Shale). These hydrogeologic conditions preclude the movement of legacy site-related contamination within the artificial groundwater system beneath the former tailings pile (current location of the disposal cell) into the deeper aquifers.

16.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2007.

16.3.6 Photographs

Table 16–2. Photographs Taken at the Shiprock, New Mexico, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	315	Windblown sand and sediment buildup along the southwest perimeter fence line.
PL–2	350	Debris accumulation along the outflow channel fence.
PL–3	110	Treated vegetation on the northeast side slope of the cell.
PL–4	300	Southern phytoremediation test plot.



SHP 8/07. PL-1. Windblown sand and sediment buildup along the southwest perimeter fence line.



SHP 8/07. PL-2. Debris accumulation along the outflow channel fence.



SHP 8/07. PL-3. Treated vegetation on the northeast side slope of the cell.



SHP 8/07. PL-4. Southern phytoremediation test plot.

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